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Published to advance the Science of cold-blooded vertebrates

ABSTRACT OF THE PROCEEDINGS OF
THE BROOKLYN MEETING OF THE
AMERICAN SOCIETY OF ICH-
THYOLOGISTS AND HER-
PETOLOGISTS.

The fourth annual meeting of the American Society of Ichthyologists and Herpetologists was held at the Brooklyn Museum, Brooklyn, N. Y., on Friday, November 15, 1918.

The business meeting was called to order at 9:55 A. M., Mr. Murphy, chairman of the committee of local arrangements, in the chair. Present were Messrs. Engelhardt and Nichols, and by proxy, Mr. Davis and Dr. Gregory. The minutes of the preceding meeting at Cambridge, Mass., were read and approved.

The following officers were elected for the ensuing year: President, Dr. Leonhard Stejneger; Vice-presidents, Professor Bashford Dean, Dr. Barton W. Evermann and Dr. Thomas Barbour; Treasurer, Mr. Henry W. Fowler; Secretary, Mr. John T. Nichols.

Mr. Carl L. Hubbs, of Chicago, was elected a member of the board of governors of the Society.

A motion was carried authorizing the publication of a special number of COPEIA, containing an

abstract of the proceedings of the meeting, providing that the Treasury contained sufficient funds. Mr. R. C. Murphy was appointed to edit and publish the abstract.

By a unanimous vote the director, trustees, and staff of the Brooklyn Museum were tendered the thanks of the Society for their hospitable reception and for many courtesies extended.

The business meeting adjourned at 10:15 A. M.

The public sessions for the reading of papers convened in the Museum auditorium at 10:45 A. M., and continued throughout the day until 6:00 P. M., a luncheon being served for members and their guests at noon in the Museum library. In the absence of the President, and the departure of Vice-president Dean immediately after the presentation of his paper, Mr. Robert Cushman Murphy presided by request.

In a cordial address, Mr. William H. Fox, Director of the Brooklyn Museum, welcomed the members to the Museum and the city, after which the following program was presented.

JOHN T. NICHOLS, *Secretary*.

DR. CHARLES R. EASTMAN'S WORK ON FOSSIL FISHES. Major Bashford Dean, American Museum of Natural History. (No abstract.)

THE PELVIS OF DINOSAURS; A STUDY OF THE RELATIONS BETWEEN MUSCULAR STRESSES AND SKELETAL FORMS. Professor William K. Gregory, American Museum of Natural History. Lantern slides.

The dinosaurs exhibit two fundamentally different types of pelvis, and have consequently been divided by Seeley into the Saurischia, or those with reptilian pelvis, including the gigantic Sauropoda, as well as the more agile Theropoda, and the Ornithis-

chia, or those with bird-like pelvis, including the pre-dentate dinosaurs, such as *Trachodon* and *Triceratops*. The pelvis of the saurischian type is fundamentally similar to that of the Crocodilia, with certain important detailed differences, and consequently a comparative study of the muscles and limb bones of recent reptiles, especially the alligator, affords evidence as to the arrangement of the pelvic muscles in the Saurischia. The wide expanse of the ilium in the Saurischia denotes a corresponding expansion of the deep gluteal muscles and is partly an adaptation for holding one side of the heavy body poised on one limb, while the opposite limb is lifted off the ground. The forwardly directed pubis denotes an arrangement of the muscles for drawing the femur forward and inward, which is fundamentally identical with that seen in the alligator and is of comparatively primitive reptilian type. In consequence of this arrangement the transverse components of the pull of the adductor muscles on the femur were relatively great, a condition that gave great power for the support of the heavy body.

In the Ornithischia, on the other hand, the pelvis has evolved away from the primitive reptilian type toward a very bird-like type, and a comparative study of the muscles and bones of the pelvic region of birds and of reptiles indicates pretty clearly the functional significance of the ornithischian type of pelvis. In these the ischium was greatly extended posteriorly and the pubis was directed backward parallel to the ischium, so that the arrangement of the muscles in this region was doubtless quite bird-like, the muscles of adduction being greatly extended antero-posteriorly. The pectineal process of the birds is represented by a large forwardly directed "prepubic process" which the speaker thought probably bore the extended pubi-ischio-femoralis externus muscle on the outside, and the pubi-ischio-femoralis internus on the inside. Thus all the muscles of adduction were more extended antero-posteriorly than was the case in the

Saurischia and consequently the transverse components of the pull of these muscles were relatively small, while their antero-posterior components were large, an arrangement favorable for rapid progression.

Diagrams were exhibited showing the supposed arrangement of the muscles in these two types of pelvis.

The speaker expressed the hope for increasingly effective co-operation between the students of living reptiles and students of the progressive adaptation and evolution of extinct reptiles.

The paper was discussed by Dr. Uhlenhuth, Professor Gregory, and the Chair.

THE HABITAT OF *Gyrinophilus Porphyriticus*.
Mr. George P. Engelhardt, Brooklyn Museum.

Gyrinophilus porphyriticus, the so-called purple salamander, ranges throughout the whole of the Appalachian system, but is absent from the low country along the Atlantic coast. In the southern part of its range, North Carolina to Georgia and Tennessee, it is represented by *G. danielsi*, a darker race than that of the central and northern sections. Excepting in northwestern Pennsylvania, where it appears to be fairly common, it has been reported only occasionally, and, aside from its preference for cool, secluded localities, not much appears to be known of its development and habitat.

Four adults and one larva of this salamander were collected early in September, 1918, in Panther Brook, a small affluent of Winnisook Creek at its upper reaches in the narrow valley of Big Indian, Ulster Co., Catskill Mts., altitude 2,000 ft.

They were captured singly under submerged rocks in shallow pools near the source of the spring-fed brook. To obtain five specimens required the turning of several hundred stones. None were found under boulders and rotting logs in the surrounding

woods, nor in Winnisook Creek, a larger stream well stocked with trout. The fish greedily devoured specimens of *Eurycea bislineata* and *Desmognathus fuscus* thrown into the water.

When grabbed roughly *Gyrinophilus* resorts to violent contortions and, aided by its slime, is difficult to hold in the hand. None, however, attempted to bite. By gently floating them over flattened hands they could easily be transferred to collecting jars. Their color in life is yellowish or brownish gray, heavily speckled above; immaculate, cream white below. Alcohol changes the color to salmon.

Measurements of the largest adult show a total length of 7 inches; of the smallest, 6 inches. The tail, round at the base, but rapidly flattening towards the tip, is decidedly keeled above. The larval specimen, 2½ inches in length, is gilled; tail flat, broadly finned above and below.

The *Gyrinophilus* station here noted is believed to represent a typical environment for the species. It is above the white pine and oak belt in the Catskill Mountains. Hemlock, sugar maple, ash, birch and beech comprise the principal forest trees. The brook bed traverses several small ravines through a chaos of boulders and stones.

The paper was discussed by Mr. Deckert and Professor Gregory.

ON A COLLECTION OF ARCTIC FISHES. Mr. John Treadwell Nichols, American Museum of Natural History.

A portion of Mr. Nichol's paper has been published under the title "Some Marine Fishes from Northwest Greenland" (Bull. Amer. Mus. Nat. Hist., Article XIX, 1918). The remainder, which dealt with an analysis of the marine fishes found near New York, follows.

New York lies in an intermediate latitude and its fish fauna is composed of northern and southern

elements, rather equally mingled; and for that reason if one selects fifty common representative fishes from this locality they will comprise as great a variety of forms as a similar selection from any part of the world. Probably no two persons would agree on exactly the same fifty species, but probably anyone familiar with our local fishes would select a list not very different from the following:

Milbert's shark	Kingfish
Smooth dogfish	Lafayette
Spiny dogfish	Weakfish
Common skate	Bluefish
Big skate	Mackerel
Clear-nosed skate	Blackfish
Herring	Bergall
Menhaden	Blowfish
Shad	Brassy sculpin
Alewife	Hacklehead
Glut herring	Sea raven
Common anchovy	Carolina sea-robin
Smelt	Striped sea-robin
Eel	Toadfish
Common killy	Eelpout
Striped killy	Silver hake
Sheepshead minnow	Cod
4-spined stickleback	Tomcod
Billfish	Squirrel hake
Pipefish	Fluke
Common silverside	Flatfish
Common mullet	Sundial
White mullet	American sole
Striped bass	Angler
Sea bass	
Porgy	

It will be seen that this list comprises representatives of twenty-eight (28) families, that is, there are 56% as many families as species. A locality in the Arctic would show nothing like the variety, for although Arctic fishes are very abundant in individuals, they belong to very few types. Were the list from an intermediate northern locality, it would lack many of the southern families, and therefore show less variety. Of the 28 families, for instance, I would consider the toadfish, sea-robins, blowfish, bergall, mackerel, bluefish, weakfish, porgy, sea bass, mullet, silver-side, pipefish, billfish, killys, anchovy, herrings and Milbert shark families, that is, 17, or a little less than $\frac{2}{3}$ of the total, to be southern; the angler, cod, silver hake, eelpout, sculpin, stickleback, spiny dogfish families, that is, $\frac{1}{4}$ of the total, to be northern. As a matter of fact, New York is sufficiently far north to have in its fauna all the northern elements, the smelt, sculpin, eelpout and cod families being the ones most characteristic of the Arctic; and it is sufficiently far south to have most southern elements represented, even the wrass family, characteristic of tropical coral reefs, being represented by its most northern species (bergall). A more southern locality would lose northern types, and though many southern types would come in to take their place, there would be a dominance of species belonging to certain of the characteristically southern families, and the fifty commonest species would be less scattered and varied.

A broader grouping based partially on relationship and partially on ecological status, that is, similar adaptation of more or less unrelated fishes, leads me to divide our local list into 19 major groups, as follows:

Sharks, skates, herrings (including anchovies), smelt, eel, killys, stickleback, billfish, pipefish, silver-side and mullets, bass to bluefish, mackerel, blackfish to blowfish, sculpins and sea-robins, toadfish, eelpout, cods, etc., flatfishes and angler.

Here the division is one of personal judgment, and though I would not expect other ichthyologists

to agree entirely, I think they would, in the main. Of these 19 divisions, flatfishes, cods, eelpout, sculpins, stickleback, and smelt are northern (that is, 6), and the remainder southern in affinities, with the exception of the eel, a catadromous fish, and the angler, whose affinities are deep sea.

An interesting corollary observation is to note the division of the sculpin group, of generally northern affinities into northern and southern divisions, our two families being one northern and the other southern, both represented by common species locally. And to compare this with the flatfish (most developed northward) group, where there is a deep-sea family, the soles, and a shore family, the flounders, the shore family having northern and southern species. It so happens that our sole is a southern shore representative of the deep-sea group, and of the three common flounders, the fluke is southern, flatfish northern, and sundial temperate. It may also be mentioned that the large blenny family has split into northern and southern forms, and is not represented in local waters by any common fish on account of the intermediate position of same.

The paper was discussed by the Chair.

AN ADIRONDACK PERCH-PIKE PROBLEM. Mr. Charles W. Mead, American Museum of Natural History.

The speaker had fished practically every day during the month of August, in the years 1915-18, in Stony Creek Ponds, Coreys, Franklin County, N. Y. For the first three years of this period yellow perch were abundant, and pike were so scarce that but three or four would be caught during the month. In August, 1918, however, pike proved abundant, and perch so rare that it was difficult, and sometimes impossible, to obtain one for bait. What caused this reversal in the proportions of the fish population?

Whence came the great numbers of pike, and what has become of the perch?

The paper was discussed by Dr. Ballou, Messrs. Titcomb, Nichols, Engelhardt, and the Chair.

FISH CONSERVATION IN NEW YORK STATE. Mr. John W. Titcomb, N. Y. State Conservation Commission.

Mr. Titcomb, after praising the work of his predecessor, Dr. Bean, explained that the Conservation Commission divided its work in the science of fishes into three divisions, one devoted to protection, another to licensing fisheries, and a third, of which he is head, to propagation. His work relates to the operation of hatcheries and everything relevant to making the waters of the State more productive. He referred to the permanent policy which the Commission is adopting as to the selection of species to stock certain waters, having in mind the investigations which have been and are being made pertaining to the relation of species of fishes to one another, the object being to save waste in the disposition of the hatcheries. Practically all waters can be improved by stocking. All waters have their limitations as to the yield of fish in pounds. The introduction of a species new to a body of water may improve the fishing, but not necessarily so. Nature's balance may be upset entirely. The newly introduced species may afford indifferent fishing, and the total yield of fish of all kinds may be less than before the stocking took place.

One of the most important and constructive efforts of the Commission at the present time is the utilization of abandoned portions of the old Erie and Champlain Canals for the propagation of warm water fishes.

The paper was discussed by Dr. Ballou and the Chair.

OBSERVATIONS ON THE DISTRIBUTION OF THE BLIND TEXAN CAVE SALAMANDER, *Typhlomolge rathbuni*. Dr. E. Uhlenhuth, Rockefeller Institute for Medical Research. Lantern slides.

In order to collect a larger number of the blind salamander, *Typhlomolge rathbuni*, two months (August and September, 1916) were spent in San Marcos, Texas. On this occasion several observations regarding the distribution of this animal were made.

In addition to specimens taken from the artesian well of the U. S. Fish Hatchery in San Marcos, *Typhlomolge* were collected in Ezell's Cave, Beaver Cave and Frank Johnson's Well. These three localities contain the water of the subterranean Purgatory Creek system.

At present then it is certain that *Typhlomolge* inhabits the lower Purgatory Creek system and also a system which supplies the San Marcos artesian well and is part of the large sweet water horizon. So far as known, the other artesian wells supplied by the sweet water system and the fissure springs coming from this system do not contain *Typhlomolge*. This is due probably to the possibility that the original habitat of *Typhlomolge* is the Purgatory Creek system, and that the artesian well system communicates with the Purgatory Creek system by means of subterranean channels more than 200 feet in depth, while the other parts of the sweet water horizon do not receive any water from the Purgatory Creek.

From the conditions found in the habitat of *Typhlomolge* it is evident that this salamander prefers water which is under high pressure. Observation of several specimens of *Typhlomolge* in its natural home shows that the animals are walkers and climbers, that their senses are very dull, as demonstrated by the apparently complete absence of light perception and the very weak perception of water waves. Observation of the animal under natural as well as

laboratory conditions, reveals the presence of a number of habits so far found only in the larvae of the red salamander, *Eurycea rubra*. Since the animal does not possess thyroids, according to the finding of E. T. Emmerson, it is almost certain that it cannot metamorphose into a land salamander. The suggestion made by Emmerson, that *Typhlomolge* possibly is the larva of an unknown species of *Eurycea*, meets with difficulty, since, with the exception of *Plethodon glutinosus*, no other salamander inhabits the caves in which *Typhlomolge* is found.

Discussion followed by the Chair and Mr. Deckert.

FIELD OBSERVATIONS ON *Ambystoma Tigrinum* IN SOUTHWESTERN UTAH. Mr. George P. Engelhardt, Brooklyn Museum. Lantern slides. No abstract. Discussion by Dr. Uhlenhuth and the Chair.

A PROPOSED REDUCTION PLANT FOR THE UTILIZATION OF FISH PRODUCTS. Captain A. D. Doty, New York City.

By invitation, Captain A. Duane Doty, late Infantry, U.S.N.A., A.E.F., briefly addressed the Society, describing a new enterprise of which he is the originator.

Recognizing the great need and opportunity for co-operating efficiently with the Government in increasing the supply of food, and especially of fish, as the best substitute for meat, Captain Doty and several New York gentlemen have organized The St. Andrew's Bay Company to do a general fish business at St. Andrew, Florida.

The company has the active interest and co-operation of the officials of The Bureau of Fisheries and The Food Administration, who have long been anxious to see the fisheries of the Gulf District developed and modernized.

The plans call for the erection of a new, compact, sanitary factory, completely equipped with every form of modern time and labor saving machinery.

The plant will comprise: 1. The Food Division, devoted to sharp freezing, curing and canning the fine fish for which the southern waters are noted. 2. The Reduction Division, utilizing all non-food fish, scrap and waste in the production of fish meal, oil, glue, glycerine, fertilizer material and other by-products. 3. The Tanning Division, manufacturing leather from the skins of shark, ray and porpoise. 4. The Fleet Division, equipped for catching all varieties of fish, including turtle, shark and porpoise.

The company will be the first to combine all departments of the fish business in one co-ordinated plant, organized under the "no-waste," efficiency principles so successfully applied in the meat packing industry.

The company will also be the first to catch and completely utilize all varieties of sharks on a commercial scale, deriving from them leather, food, oil, glue, glycerine, fish meal and fertilizer material.

The executive office will be in New York City.

EGG-LAYING HABITS OF THE PILOT SNAKE, *Callopeltis obsoletus*. Mr. Oliver P. Medsger, Arlington, N. J. Illustrated by photographs.

At Jacob's Creek, Pa., during July, 1913, Mr. Medsger came upon a pair of pilot snakes whose actions seemed out of the ordinary. They had the habit of lying on the surface or burying themselves in an old sawdust pile. When carried away, they would return to the spot. After observing them for three weeks, Mr. Medsger secured a fork, and at a depth of twelve inches dug up 44 eggs of the pilot snake. The male snake was coiled about the eggs. The sawdust, which was about five years old, was cold and wet. The snakes after lying in the hot sun, had the habit of crawling down to the eggs and coiling about

them. As sawdust is a non-conductor, and, at that depth, never would get warm, Mr. Medsger advanced the theory that these snakes by lying in the hot sun until they were warm and then going down to the eggs, were transferring heat from the surface to the eggs and the surrounding sawdust, causing development to go on more rapidly.

Two years later, (July, 1915), this or another pair of pilot snakes, on the same sawdust pile were going through like habits. At that time, Mr. Medsger dug out 24 eggs. On August 1st these eggs were just starting to develop.

A number of photographs of the snakes and eggs were exhibited.

The paper was discussed by Doctors Ballou, Uhlenhuth, Messrs. Titcomb, Engelhardt, and the the Chair.

NOTES ON THE FIRST TURTLE I EVER SAW. Mr. Oliver P. Medsger, Arlington, N. J. Illustrated by photographs.

In 1878, the speaker's brothers cut their initials and the date on the plastron of a land tortoise found on the family farm near Pittsburg, Pa. Eighteen years later Mr. Medsger found this same tortoise not more than a hundred yards from the original station. Again, in July, 1913, thirty-five years after he had first seen the animal, he found it within one hundred and fifty yards of the original spot. It looked neither larger nor older than when he had beheld it as a boy.

THE REPTILES OF BORNEO. Mr. H. C. Raven, United States National Museum. (No abstract.) Discussion by Dr. Uhlenhuth and the Chair.

CONGO CROCODILES, LIZARDS AND TURTLES. Mr. Herbert Lang, American Museum of Natural History.

Mr. Lang, leader of the American Museum Congo Expedition, read his "Ecological Notes on

Congo Crocodiles," written for the report on turtles, crocodiles and lizards by Mr. Karl P. Schmidt, which is now in course of publication.

In company with Mr. James P. Chapin, the party traveled for six years in the Belgian Congo and had ample opportunity for observations. The discovery in the interior of the Congo Basin of a new genus of crocodile, *Osteoblepharon osborni*, called for a comparison of the habits and distribution of the other three species occurring in Africa: *Crocodylus niloticus*, *C. cataphractus* and *Osteolaemus tetraspis*. It was shown that the Nile crocodile is probably an immigrant in the Congo Basin and the only crocodile occurring outside of the West African Forest Province, and that the other forms are evidently adapted to moist West African conditions. It seems surprising that crocodiles are comparatively rare in the Congo Basin, one of the best-watered tropical regions in the world, with wide and tranquil stretches that make it apparently the most ideal for them, especially as rapids and swifter currents are confined to short sections. Perhaps the scarcity of food and the intermittent character of many of the affluents in this region may be mentioned as important factors in an explanation. An interesting account of native beliefs and methods of trapping crocodiles was followed by the statement that in all the six years' field work not one authentic case of loss of human life due to crocodiles was heard of, although the expedition employed thousands of porters and was in constant relation with many native tribes.

ICHTHYOLOGICAL NOTES OF AN AUTUMN FISHING TRIP FROM THE PORT OF NEW YORK. Mr. Robert Cushman Murphy, Brooklyn Museum. (Published in part below, under the title "Notes on a Mackerel Shark from New York.")

In the absence of the contributors the following eight papers were read by title:

NOTES ON THE EGGS AND LARVAE OF SOME SOUTHERN AND WESTERN NORTH AMERICAN SALIENTIA. Professor Albert Hazen Wright, Cornell University.

SOME HABITS OF THE PIGMY HORNED LIZARD. Mr. Herbert J. Pack, Salt Lake City, Utah. (Published in COPEIA, No. 63, pp. 91, 92, 1918.)

THE FISHES OF PERRY COUNTY, PENNSYLVANIA. Mr. Henry W. Fowler, Philadelphia Academy of Natural Sciences. (Published in COPEIA, No. 63, pp. 89-91, 1918.)

A SNAKE ITEM. Mr. C. S. Brimley, North Carolina State Museum. (Published in COPEIA, No. 64, p. 97, 1918.)

THE FRESH-WATER LAMPREYS OF THE EASTERN UNITED STATES. Dr. David Starr Jordan, Stanford University. (Published in COPEIA, No. 64, pp. 93-96, 1918.)

A NEW RECORD FOR *Rana Septentrionalis* BAIRD. Mr. Philip H. Pope, Manchester, Me. (Published in COPEIA, No. 64, pp. 96, 97, 1918.)

INDUSTRIAL UTILIZATION OF SHARKS, WITH AN EXHIBITION OF SHARK-SKIN LEATHERS. Mr. Alfred Ehrenreich, New York City.